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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/727,038	11/30/2000	Tinku Acharya	INTL-0512-US (P10263)	2991

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EXAMINER

HENN, TIMOTHY J

ART UNIT PAPER NUMBER

2612

DATE MAILED: 07/20/2004

*[Handwritten number 5]*

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/727,038

Applicant(s)

ACHARYA ET AL.

Examiner

Timothy J Henn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 18-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 18-21 is/are rejected.
- 7) ☒ Claim(s) 7-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of group I in the reply filed on May 7, 2004 is acknowledged.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4 rejected under 35 U.S.C. 102(b) as being anticipated by D'Luna et al. (US 5,008,739).

**[claim 1]**

In regard to claim 1, note that D'Luna et al. (hereinafter referred to as D'Luna) discloses a method comprising: estimating a plurality of interpolated first color values from a plurality of first color values in a sub-block of image data (Figure 4; c. 6, l. 41 - c. 7, l. 17), wherein the image data comprises first color values, second color values, and third color values (Figure 3, c. 4, ll. 42-50); deriving a plurality of second color hues (e.g. red) using the second color values and the interpolated first color values (Figure 4; c. 7, ll. 50-61); and estimating a plurality of interpolated second color hues using the second color hues (c. 8, l. 37 - c. 9, l. 11).

**[claim 2]**

In regard to claim 2, note that D'Luna discloses a method further comprising:  
deriving a second plurality of second color values from the plurality of interpolated  
second color hues (c. 9, ll. 8-21).

**[claim 3]**

In regard to claim 3, note that D'Luna discloses a method further comprising:  
deriving a plurality of third color hues (e.g. blue) using the third color values and the  
interpolated first color values (Figure 4; c. 7, ll. 50-61); estimating a plurality of  
interpolated third color hues using the third color hues (c. 8, l. 37 - c. 9, l. 11); and  
deriving a second plurality of third color values from the plurality of interpolated third  
color hues (c. 9, ll. 8-21).

**[claim 4]**

In regard to claim 4, note that D'Luna discloses a method further comprising:  
identifying four direct neighbors in the sub-block; and using the first color values from  
the four direct neighbors to estimate an interpolated first color value (See Figures 3, 4(f)  
and 4(g) of USP 4,663,661 which is incorporated by reference in D'Luna (c. 4, ll. 42-47;  
c. 6, ll. 41-65).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all  
obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over D'Luna et al. (US 5,008,739) in view of Hel-or et al. (US 6,404,918).

**[claim 5]**

In regard to claim 5, note that D'Luna discloses all limitations except for a smooth zone detecting step. However, it is known in the art to detect smooth and non-smooth zones and to interpolate using different methods accordingly, see for example Hel-or et al. (hereinafter referred to as Hel-or) (c. 4, ll. 4-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to interpolate based upon a detection result of a smooth/non-smooth zone as taught by Hel-or to correctly interpolate image data without generating color artifacts along edges (c. 3, ll. 41-53).

**[claim 6]**

In regard to claim 6, note that Hel-or classifies an area as a smooth zone when the dominant orientation vector is low or zero (i.e. the neighboring pixels are substantially similar; c. 4, ll. 4-15).

6. Claims 18-21 rejected under 35 U.S.C. 103(a) as being unpatentable over D'Luna et al. (US 5,008,739).

**[claims 18-21]**

Claims 18-21 contain the limitations of claims 1-4 with the added limitation that the method is stored as a software program in a computer readable medium. However, it is well known in the art to implement methods in computer software as an easy way to

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implement methods using commercially available microprocessor technology and solid-state storage mediums (Official Notice). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the method of claims 1-4 in computer software as claimed. For further details see the above discussion of claims 1-4.

***Allowable Subject Matter***

7. Claims 7-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**[claims 7 and 8]**

In regard to claims 7 and 8 the prior art does not teach or fairly suggest an edge interpolation method which averages three of four pixels, multiplies the average by a predetermined value to produce a result and averages the result with the remaining pixel.

**[claims 9 and 10]**

In regard to claims 9 and 10 the prior art does not teach or fairly suggest a stripe interpolation method which averages two direct neighbor pixels that are substantially similar, multiplies the average by a predetermined value to produce a first result, averages the remaining two direct neighbor pixels to produce a second result, adds the first and second results together to produce a third result and divides the third result by four.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art further shows the current state of the art in demosaicing pixel interpolation methods:

i.	Cok	US 4,630,307
ii.	Tai	US 5,504,100
iii.	Hibbard	US 5,382,976
iv.	Kawamura et al.	US 6,563,537


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J Henn whose telephone number is (703) 305-8327. The examiner can normally be reached on M-F 7:30 AM - 5:00 PM, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R Garber can be reached on (703) 305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TJH  
7/2/2004

  
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